# Exercise I – computing likelihood values

In order to solve these exercises you need to apply the rules of the CORAS calculus from the second lecture on security analysis.

1)



**Figure 1**

    a)   What is the likelihood of the threat scenario to the left in Figure 1?
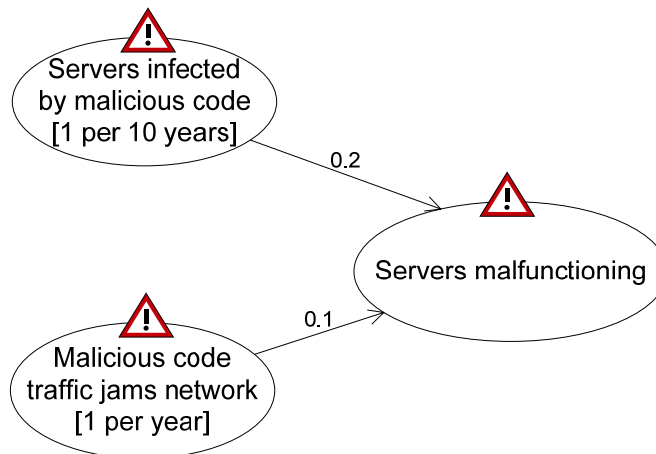    b)   What is the likelihood of the threat scenario to the right in Figure 1?

2)



**Figure 2**

    a)   Assume the two threat scenarios to the left in Figure 2 are statistically independent. What is the likelihood of the threat scenario to the right in Figure 2?
    b)   What is the likelihood of the threat scenario to the right in Figure 2 if we assume the two threat scenarios leading to it are mutually exclusive?
    c)   Assume we assign the likelihood `1 per 20 years' to the threat scenario `Servers malfunctioning'. Is that consistent with the rest of the diagram?

# Exercise II – computing likelihood intervals

In many practical situations, it is difficult to find exact likelihood values for threat scenarios and unwanted incidents. In such cases it can be useful to operate with intervals. In Table 1 we have defined five qualitative likelihood values that each corresponds to an interval of frequencies. You shall use the qualitative likelihood values from Table 1 in the following exercises.

| | Qualitative likelihood value | Interval |
|---|---|---|
| 1 | rarely | <= 1 per 10 years |
| 2 | seldom | > 1 per 10 years & <= 1 per 5 years |
| 3 | sometimes | > 1 per 5 years & <= 1 per 1 year |
| 4 | often | > 1 per 1 year |

**Table 1: Likelihood intervals**

Hint: In order to compute the likelihood when we use intervals, you can apply the rules of the CORAS calculus to find the minimum and maximum values.

1)



**Figure 3**

    a) What is the correct qualitative likelihood value for the threat scenario to the left in Figure 3 (i.e., should it be Rarely, Seldom, Sometimes or Often)?
    b) What is the correct likelihood value of the threat scenario to the right in Figure 3?
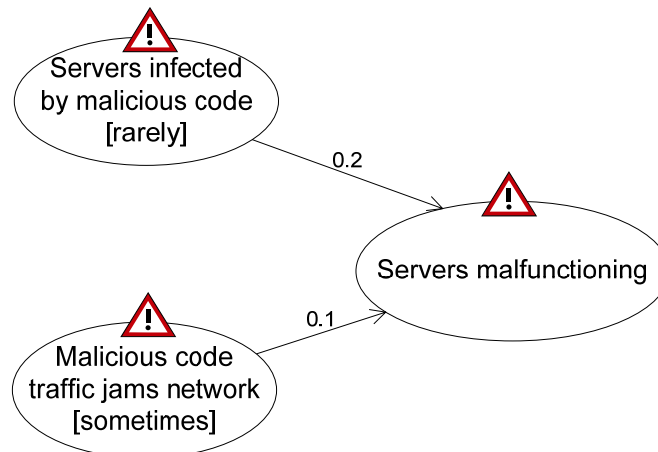
2)



**Figure 4**

    a) Assume the two threat scenarios to the left in Figure 2 are statistically independent. What is the likelihood of the threat scenario to the right in Figure 2?
    b) What is the likelihood of the threat scenario to the right in Figure 2 if we assume the two threat scenarios leading to it are mutually exclusive?
    c) Assume we assign the likelihood `Rarely' to the threat scenario `Servers malfunctioning'. Is that consistent with the rest of the diagram?
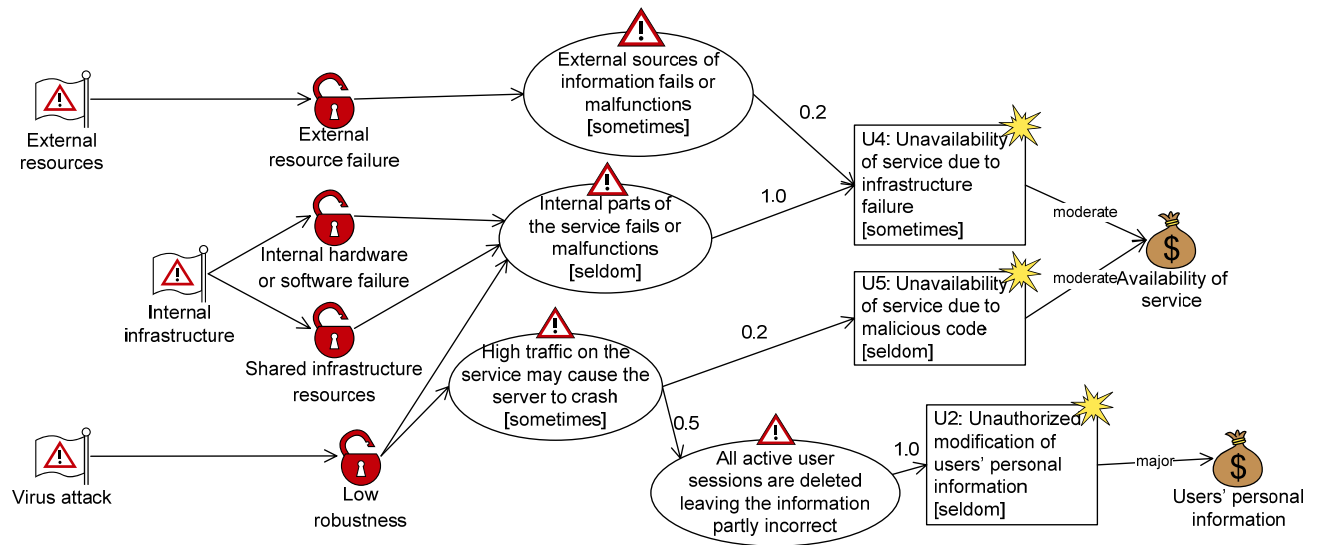
3)



**Figure 5**

a) Check the consistency of the likelihood values in the threat diagram in Figure 5.
b) How can the diagram be corrected in order to make it consistent?